EP 1 371 439 A1 (2)

(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 1 371 439 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
17.12.2003 Bulletin 2003/51

(21) Application number: **03253664.1**

(22) Date of filing: **10.06.2003**

(51) Int Cl.[7]: **B23K 9/04**, B23K 10/02, B23K 26/34, B23K 37/06, B23P 6/04, F01D 5/00, F01D 5/18

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IT LI LU MC NL PT RO SE SI SK TR
Designated Extension States:
AL LT LV MK

(30) Priority: **10.06.2002 US 167679**

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(54) Method of weld repairing a component with a refractory metal backing material

(57) The present invention relates to a method for repairing components such as blades used in turbine engines. The method comprises the steps of placing a piece of refractory metal material (16) over an area of the component to be repaired (12) and depositing a repair filler metal material (20) over the piece of refractory material (16) in an amount sufficient to repair the component and welding the repair filler metal material (20) in place. The refractory metal material (16) may be selected from the group consisting of niobium, tantalum, molybdenum, tungsten, a metal having a melting point higher than the melting point of nickel, and alloys thereof and may be uncoated or coated.

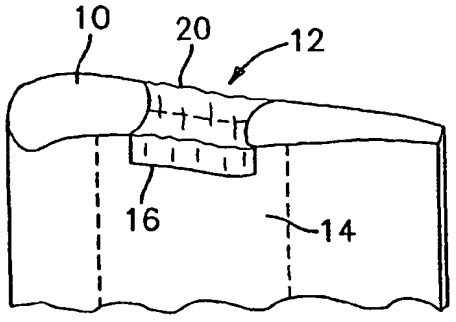

FIG. 1

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8. A method according to claim 7, wherein said refractory metal material (16;32) further has a nickel plating over said outer layer.

9. A method according to any preceding claim, wherein said placing step comprises placing a piece of refractory metal material (16;32) having a melting point in excess of 1455°C over said area.

10. A method according to claim 9, wherein said refractory metal material (16;32) has a melting point in excess of 1650°C.

11. A method according to any preceding claim, wherein said component comprises a component for a turbine engine having an internal cooling cavity (14) and said placing step comprises positioning said refractory metal material (16) so as to prevent said repair filler metal material (12) from entering said internal cooling cavity (14).

12. A method according to any preceding claim, wherein said refractory metal material (16) is a cut foil which conforms to a shape of an internal cooling cavity (14) in said component.

13. A method according to any preceding claim, further comprising removing said refractory metal material (16;32) after said welding step has been completed using an acid chemical treatment.

14. A method according to any of claims 1-12, further comprising removing said refractory metal material (16;32) after said welding step has been completed using an oxidizing heat treatment.

15. A method according to any preceding claim, wherein said placing step comprises placing said piece of refractory metal material (16;32) over an area of an investment cast compact to be repaired.

16. A method for repairing a tip portion (10) of a turbine blade comprising the steps of:

positioning a refractory metal backing material (16) over an area to be repaired (12); and

depositing a repair filler metal material (20) over said refractory material and welding said repair filler metal material.

17. A method according to claim 16, wherein said positioning step comprises positioning a piece of refractory metal material (16) selected from the group consisting of niobium, tantalum, molybdenum, tungsten, a metal having a melting point higher than the melting point of nickel, and alloys thereof over said area to be repaired (12).

18. A method according to claim 16 or 17, wherein said positioning step comprises positioning a piece of refractory metal material (1A) plated with a nickel containing material over said area to be repaired (12).

19. A method according to claim 16 or 17, wherein said positioning step comprises positioning a piece of refractory metal material (16) coated with a chromium containing material over said area to be repaired (12).

20. A method according to claim 16 or 17, wherein said positioning step comprises positioning a piece of refractory metal material (16) having an oxide ceramic coating layer, an intermediate layer of silicide, and a plated nickel outer layer over said area to be repaired (12).

21. A method according to any of claims 16 to 20, further comprising removing said refractory metal material (16) after said welding step has been completed using an acid chemical treatment.

22. A method according to any of claims 16 to 20, further comprising removing said refractory metal material (16) after said welding step has been completed using an oxidizing heat treatment.

23. A method for repairing a trailing edge (30) of a turbine blade comprising:

cutting a refractory metal material foil (32) to conform to a trailing edge shape of said blade;

positioning said cut refractory metal material foil (32) over a portion (34) of said trailing edge to be repaired; and

applying a repair filler metal material over said refractory metal material foil (32) and welding said repair filler metal material to effect said repair.

24. A method according to claim 23, wherein said cutting step comprises cutting a foil material (32) formed from a refractory metal selected from the group consisting of niobium, tantalum, molybdenum, tungsten, a metal having a melting point higher than the melting point of nickel, and alloys thereof.

25. A method according to claim 24 or 25, wherein said foil material (32) has a nickel plating thereon.

26. A method according to claim 24 or 25, wherein said foil material (32) has a chromium coating thereon.

27. A method according to any of claims 24 or 25,

wherein said foil material (32) has a nickel plated ceramic coating thereon.

28. A method according to any of claims 23 to 27, further comprising removing said refractory metal foil material (32) after said welding step has been completed using an acid chemical treatment.

29. A method according to any of claims 23 to 27, further comprising removing said refractory metal foil material (32) after said welding step has been completed using an oxidizing heat treatment.

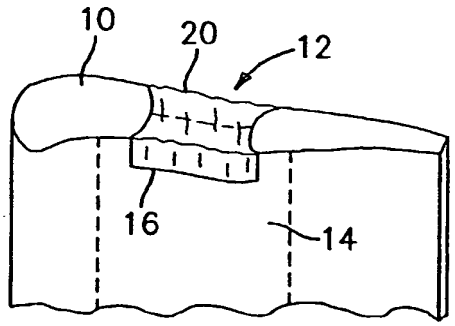

FIG. 1

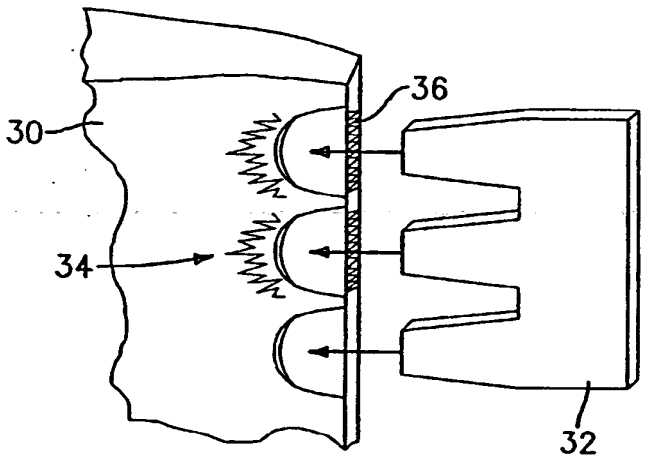

FIG. 2

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EUROPEAN SEARCH REPORT

Application Number
EP 03 25 3664

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A	* column 5, line 22 - column 7, line 48; figures 1,2 *	3-8, 18-20, 25-27	TECHNICAL FIELDS SEARCHED (Int.Cl.7) B23K B23P F01D
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
MUNICH	12 September 2003	Jeggy, T

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EPO FORM 1503 03.82 (P04C01)

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EUROPEAN SEARCH REPORT

Application Number
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